

APPENDIX

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1. Invention Name

Internet Fax Appliance, here forth referred to as IAX.

1.1 Invention Summary

IAX is a self contained Internet Appliance with capabilities of color scanning and printing to paper, and Audio-Visual input/output capabilities. IAX connects to Internet either through PSTN using its internal modem or through DSL/LAN using its Ethernet interface.

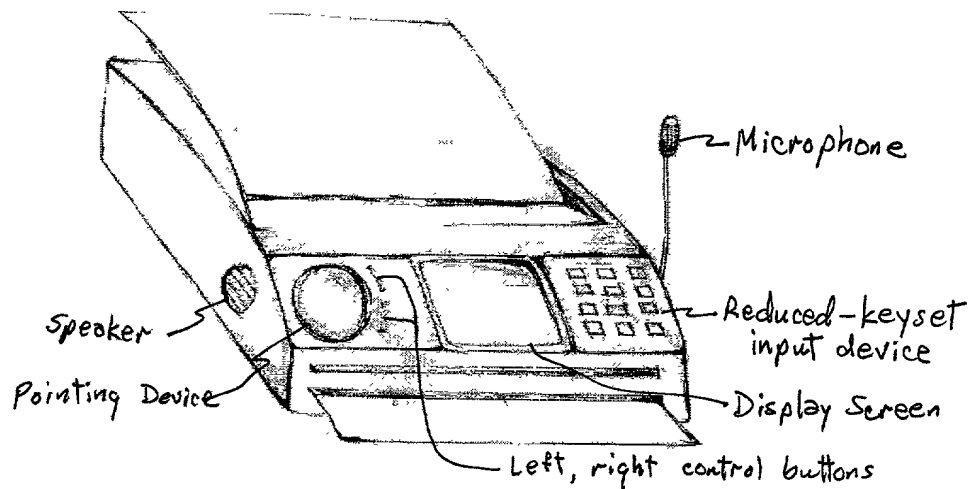


Figure 1: The Internet Fax Appliance.

1.2 Related Inventions

- (1) Fax machine
- (2) Color Optical Scanner
- (3) Ink-jet and Thermal Color Printer
- (4) Active Matrix and TFT Liquid Crystal Display (LCD)
- (5) LCD Touch-Sensing Pointing Device and Track-Ball Pointing Device
- (6) Infra-red Remote Control Unit (RCU)
- (7) SVGA and Composite Video output to Television
- (8) Internet connection using Modem through PSTN and Ethernet LAN/DSL
- (9) Digital Camera and Camcorder
- (10) Digital Video Recorder (DVR)
- (11) USB Devices Interface

2. Appliance Utility

A fax machine can scan a monochrome (black-and-white) printed document, convert it to a digital image, and transmit that image over Public Service Telephone Network to another fax machine that decodes and prints the transmitted digital image to paper. Optionally the digital image can be saved into the local fax machine's internal memory buffer for later printing or retransmission. This is point-

to-point communication occurring between two similar appliances. Most fax machines are also equipped with microphone and speaker for normal telephone conversations. The scanner and printer combination of the fax machine can also be set up to perform like a low-resolution photocopy machine.

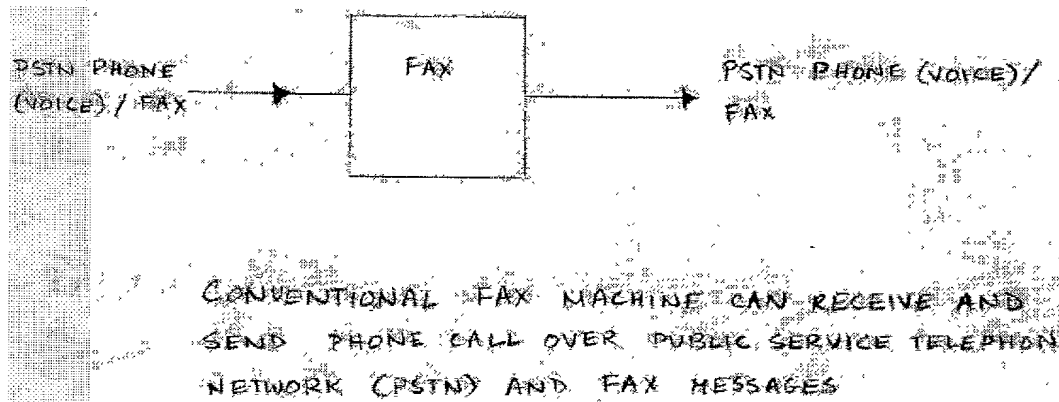
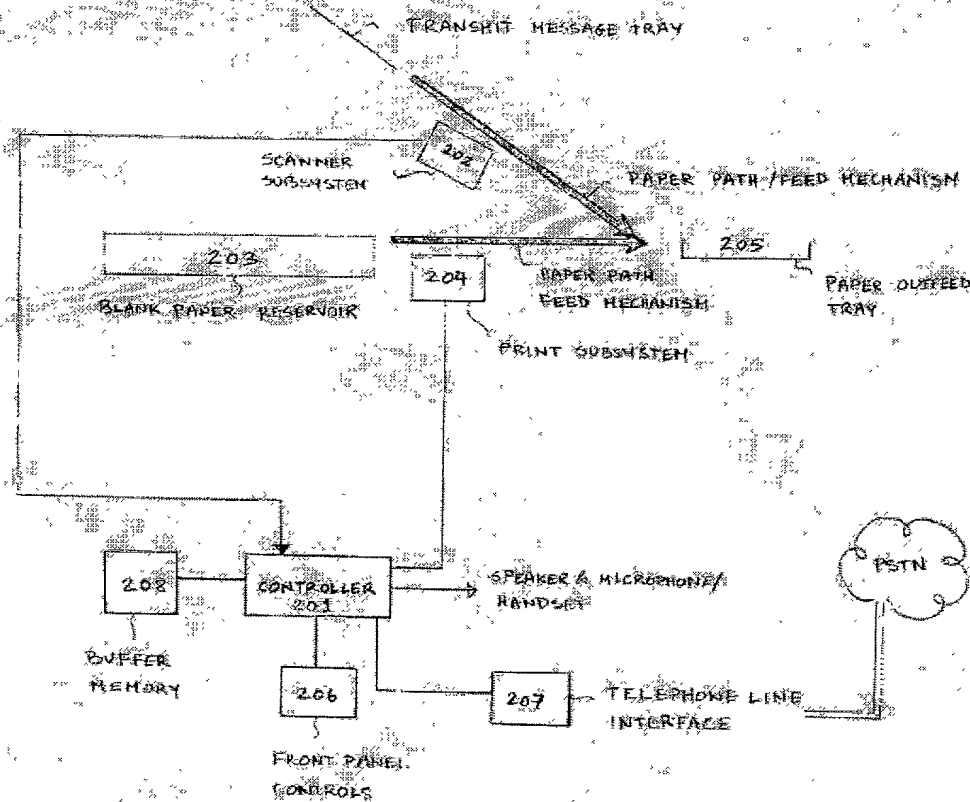


Figure 2(a): Functional schematic of a typical Fax machine.

IAX appliance is capable of scanning higher resolution color printed paper document with its built-in optical scanner, convert it to digital image, and (1) transmit it as conventional Fax message to a fax machine, (2) transmit the image to another fax machine using cheaper Internet Fax service, (3) transmit the image as a Color Fax to another IAX appliance or other compatible Color Fax machines, (4) email the document as an image to any Internet email address, (5) transfer the document to the Internet IAX server to convert to text and graphics HTML page, then email the document as HTML page to any Internet address, (6) publish the image document, or the converted HTML page to an Internet web site, (7) save the message in IAX Internet Server storage for future use, and (8) print color copies of the document. IAX appliance can also download specific content from Internet and perform any of the functions listed in the previous paragraph. The content include (but not limited to) greeting cards, current news articles and pictures.



CONVENTIONAL COMPONENTS OF A TYPICAL FAX MACHINE

Figure 2(b): High-level hardware components schematic of a conventional Fax machine.

IAX appliance can (1) receive conventional Fax messages through PSTN, (2) receive email from any Internet address, (3) receive Color Fax messages from another IAX or compatible Color Fax machines, (7) show Internet web pages using its built-in browser, (4) save the message/content received in IAX Internet server storage for later use. (5) The received message can either be viewed in the IAX's LCD display or in Television, if one is connected; or (6) Color Printed to paper using its built-in Ink-jet/Thermal Color Printer.

IAX can take digital still image input from a external Digital Camera connected via its USB port(s). Once a digital image is captured in IAX, all of the functions listed above can be performed.

External USB Digital Video Recorder (DVR) device can also be connected to the IAX. The DVR can be used as high capacity local storage. Large amount of information can be downloaded from the Internet (for example music, movies, multimedia content) and saved locally in the DVR's storage. Later these contents can be viewed/listed to in the LCD and built-in speakers, or in a external television and hi-fi stereo system.

3. Hardware Components

Figure 2(b) shows the hardware components schematic diagram of a typical Fax machine. As illustrated in Fig. 2(b), a conventional fax device includes a controller/sequencer 201, a scanner subsystem 202, a paper intake transport mechanism 203, a printer subsystem 204, a blank paper transport mechanism 205, front panel controls 206, and a telephone communication subsystem 207. The controller/sequencer 201 is typically an embedded microprocessor system, and implements the communication protocols and generally controls the fax system device. It also contains a memory buffer subsystem 208 in which data is stored prior to transmit or after receipt. The scanner subsystem 202 is typically an optical scanner that "reads" the surface of the page(s) to be transmitted and creates an equivalent digital bitmap image. The paper intake transport mechanism 203 is a mechanical system for taking in the page(s) to be transmitted, passing them through the scanner subsystem, and placing them in an outfeed tray. The printer subsystem 204 is a printer, such as a thermal or ink-jet printer or other digital print device that creates hard copy documents based on the page image data received. The blank paper transport mechanism 205 is a mechanical system for taking blank paper from a reservoir, passing them through the printer subsystem, and placing them in an outfeed tray. The front panel controls 206 is a user interface to the fax system, typically including an array of buttons or keys and a display such as a liquid-crystal or electroluminescent display. The telephone communication subsystem 207 serves as an interface between the fax machine to the telephone line and other fax machines. The constituent components of the such as the scanner, printer, and controller are also capable of being configured as a copy machine. Documents to be copied may be scanned as if they to be faxed, and the scanner data is instead printed out to make a copy of the original document.

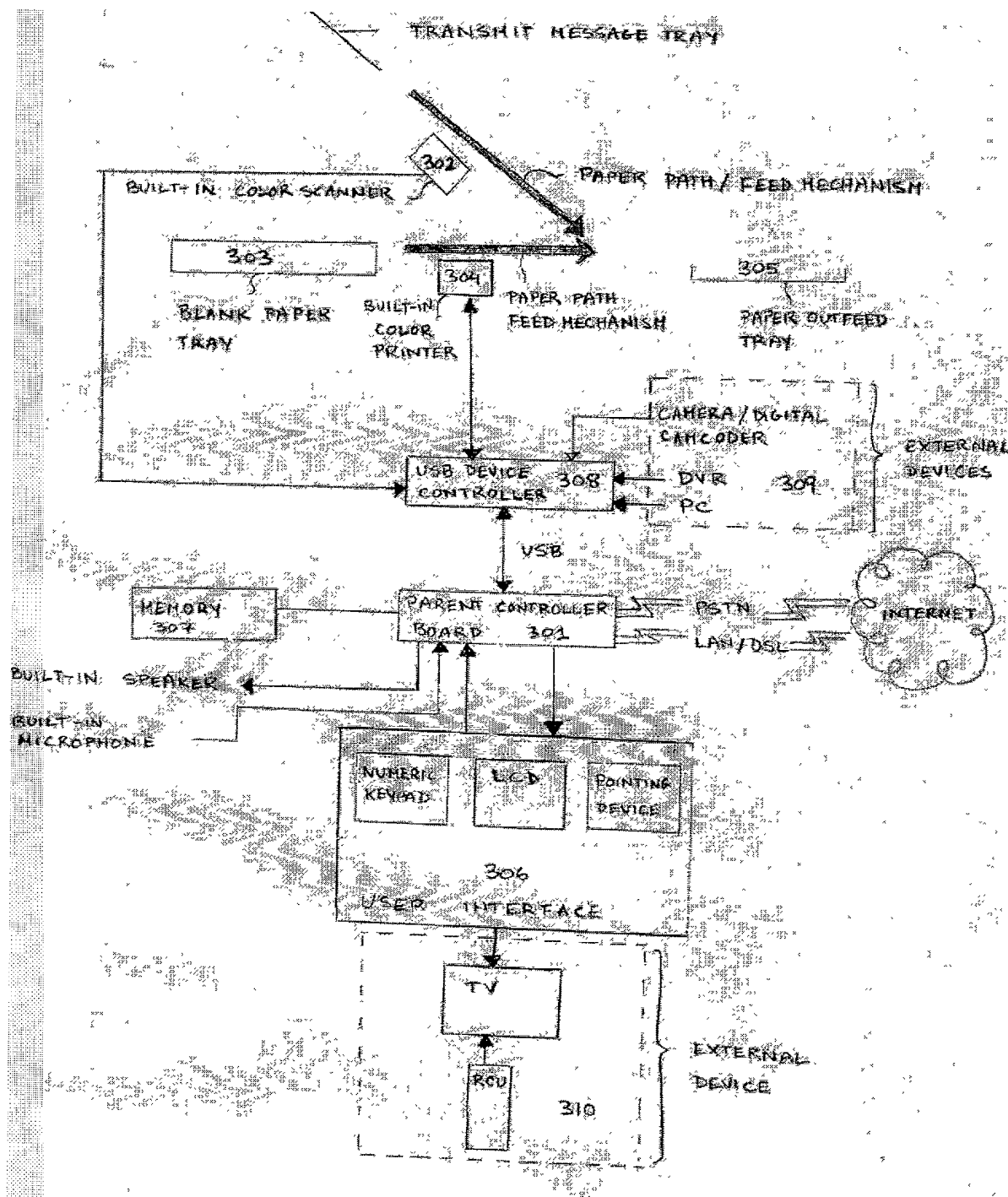


Figure 3: High-level hardware components schematic of Internet Fax Appliance.

On the other hand, IAX have extended versions of all the basic components of a fax machine, and few completely new components. Figure 3 shows the hardware components schematic of IAX. The heart of IAX is the Controller Board 301 in the middle of the diagram (this is Uniq's current Inbox).

Through its USB port it connects to a multiple USB device controller hub. Connected to this hub is the built-in Optical Color Scanner 302 and Ink-Jet/Thermal printer 304. The printer and scanner is incorporated together with the cartridge head carrying both four-color printing ink (CMYK) and a movable scanner lens. The same paper feeder mechanism 303 and paper out-feed tray are used for printing blank paper and scanning printed-paper. IAX is controlled by the display and control panel 306, which contains a twelve-key numeric pad, a Active Matrix or TFT 560x420 LCD display screen, and a touch-pad/track-ball pointing device. The pointing device can also be easily replaced by touch sensors on the LCD panel. The controller board 301 has a microprocessor, memory, audio-video controller, and built-in modem and ethernet LAN ports through which PSTN and Internet network is connected. An extended memory module 307 can be used for enhancing performance. The controller board 301 can also connect to a TV and Infra-red Remote Control Unit 310 in parallel to the user control panel 310.

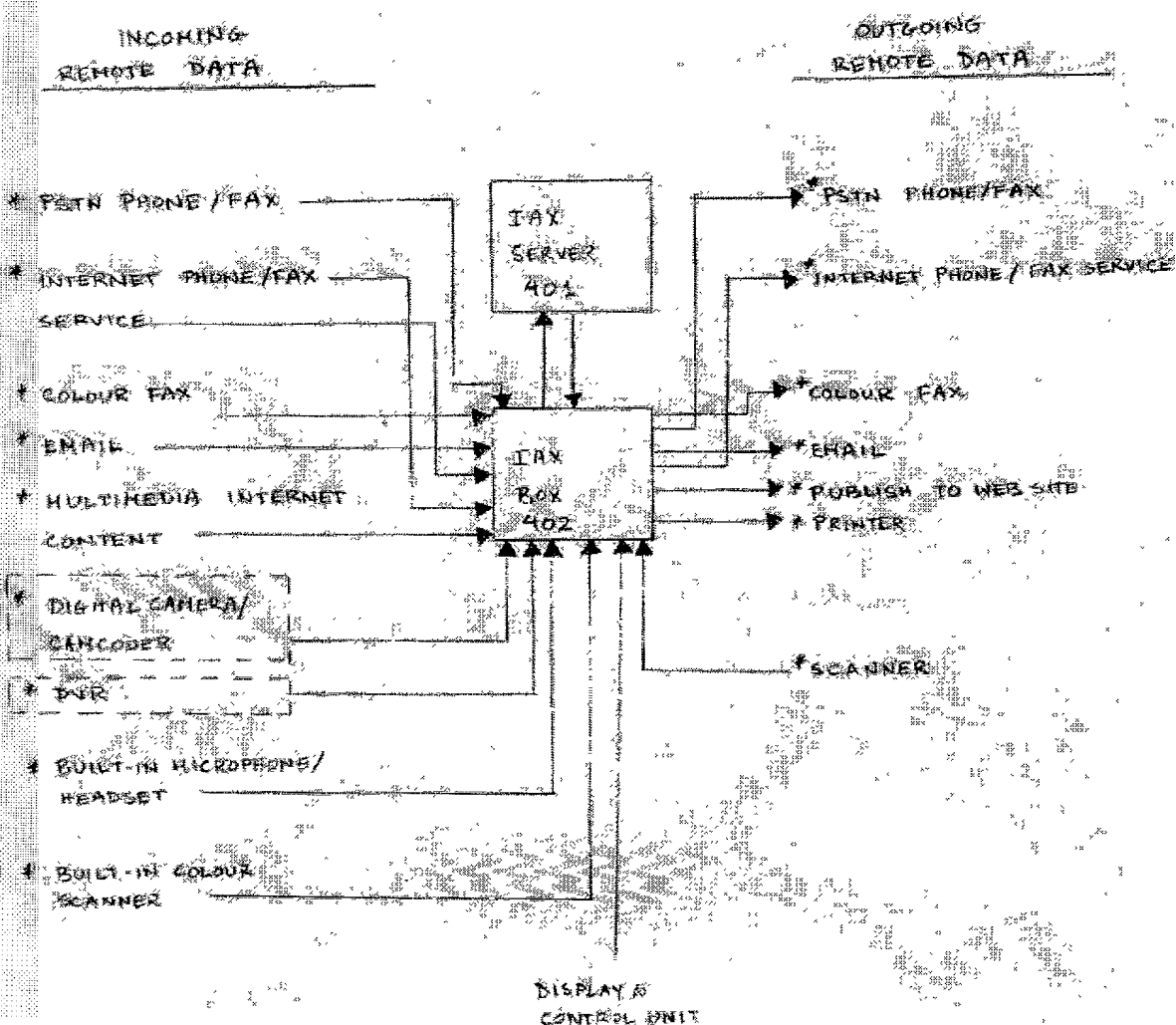


Figure 4: Input/Output schematic of an Internet Fax Appliance.

4. Input/Output Media

The primary input/output media of a conventional fax machine is (1) Low Fidelity Mono Voice (single channel) using telephone handset or hands-free speaker/microphone. and (2) Low Resolution Black-and-White Scanned and Printed Paper.

IAX extends these with (1) Higher Fidelity Stereo Audio (double channel) using microphone and head-phone or speakers; (2) Higher Resolution Color Scanned and Printed Paper; (3) Color Digital Images input through external USB Digital Camera; (4) Digital Video input/output through external USB Digital Camcorder and/or Digital Video Recorders (DVR); and (5) Downloading and publishing of digital multimedia content.

5. User Interface:

A Fax machine user control panel typically includes (1) a numeric keypad, used for telephone number entry and alpha-numeric text entry (for identification name, etc); and (2) usually a monochrome (single color) small display, such as a electro-luminescent display or liquid-crystal display (LCD), capable of only short text display. (3) The internal fax printer is sometimes used to print various information from the Fax machine (call records, etc).

IAX also uses a (1) numeric keypad for alphanumeric text entry. (2) The primary user display output is to the device's Active Matrix or TFT 560x420 LCD display. (3) A pointing device implemented using a Touch-Sensor on the LCD display or a Track-ball and Click-button.

(4) The numeric keypad and pointing device will also be available in an infer-red remote control. Four-directional arrow keys and a Select button will be used as pointing device. (5) IAX also has Composite and SVGA video output to send the display of its LCD panel to a Television.

6. Network Connection:

Typical Fax machines connect to Public Service Telephone Network (PSTN) through telephone line for point-to-point Voice and Fax message communication.

IAX can connect to another fax or telephone using its own Modem connected to PSTN for conventional Fax and Voice communication. It can use the same modem to connect to an Internet Service Provider's (ISP) PSTN number to connect to the Internet to communicate Multi-media messages. It can also connect to the faster Internet

7. External Devices:

Digital image capture devices, as Digital Camera and Digital Camcorders can connect to IAX through the USB port. IAX automatically detects the device connected, and shows appropriate display and wait for user response. Similarly, Digital Video Recording (DVR) devices can connect to IAX USB port. IAX can also be used to download multimedia content from the Internet and show digital pictures, audio and movies to the LCD display or external TV. Images and audio can be captured and printed in the local printer, saved in IAX Internet server or published to the web. IAX can also connect directly to a PC using the USB port.